MC 87-I-28A(P)

PRELIMINARY REPORT
INDUSTRY SERIES

1987 Census of Manufactures

MC87-I-28A(P)
Issued July 1989

INDUSTRIAL INORGANIC CHEMICALS

Industries 2812, 2813, 2816, and 2819

INTRODUCTION

This report presents preliminary statistics from the 1987 Census of Manufactures for those establishments classified in the industries listed above. These data will be superseded by a more comprehensive final paperbound report. The method of data collection and use of administrative data are discussed in detail in the appendix.

All dollar figures included in this report are at prices current for the year specified and, therefore, unadjusted for changes in price levels. Consequently, when making comparisons to prior years, users should take into consideration the inflation that has occurred.

The definitions of these industries are the same as those used in the 1987 Standard Industrial Classification (SIC) Manual.[1]

INDUSTRY 2812, ALKALIES AND CHLORINE

In the 1987 Census of Manufactures, Industry 2812, Alkalies and Chlorine, had employment of 5.0 thousand. The employment figure was 34 percent below the 7.6 thousand reported in 1982. Compared with 1986, employment in 1987 decreased 25 percent. The 1986 data are based on the Bureau's annual survey of manufactures (ASM), which is a sample survey conducted each year between censuses.

The total value of shipments for establishments classified in this industry was $1.5 billion.

In 1987, establishments in this industry accounted for 65 percent of products considered primary to the industry regardless of the industry in which they were produced (coverage ratio). In 1982, the coverage ratio was 53. The products primary to this industry appear in table 2 and aggregated to $2.0 billion in 1987.

The cost of materials and services used by establishments in this industry amounted to $805.5 million in 1987. Data on specific materials consumed appear in table 3.

INDUSTRY 2813, INDUSTRIAL GASES

In the 1987 Census of Manufactures, Industry 2813, Industrial Gases, had employment of 8.1 thousand. The employment figure was 11 percent above the 7.3 thousand reported in 1982. Compared with 1986, employment in 1987 decreased 6 percent. The 1986 data are based on the Bureau's annual survey of manufactures (ASM), which is a sample survey conducted each year between censuses.

The total value of shipments for establishments classified in this industry was $2.6 billion.

In 1987, establishments in this industry accounted for 94 percent of products considered primary to the industry regardless of the industry in which they were produced (coverage ratio). In 1982, the coverage ratio was 91. The products primary to this industry appear in table 2 and aggregated to $2.6 billion in 1987.

The cost of materials and services used by establishments in this industry amounted to $1.0 billion in 1987. Data on specific materials consumed appear in table 3.

INDUSTRY 2816, INORGANIC PIGMENTS

In the 1987 Census of Manufactures, Industry 2816, Inorganic Pigments, had employment of 8.5 thousand. The

[1] **Standard industrial Classification Manual: 1987.** For sale by Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. Stock No. 041-001-00314-2.

Address inquiries to Bureau of the Census, Industry Division, Washington, DC 20233, or call **Andrew W. Hait** (301) 763-2510.

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employment figure was 24 percent below the 11.2 thousand reported in 1982. Compared with 1986, employment in 1987 decreased 7 percent. The 1986 data are based on the Bureau's annual survey of manufactures (ASM), which is a sample survey conducted each year between censuses.

The total value of shipments for establishments classified in this industry was $2.4 billion.

In 1987, establishments in this industry accounted for 90 percent of products considered primary to the industry regardless of the industry in which they were produced (coverage ratio). In 1982, the coverage ratio was 88. The products primary to this industry appear in table 2 and aggregated to $2.4 billion in 1987.

The cost of materials and services used by establishments in this industry amounted to $1.0 billion in 1987. Data on specific materials consumed appear in table 3.

INDUSTRY 2819, INDUSTRIAL INORGANIC CHEMICALS, N.E.C.

In the 1987 Census of Manufactures, Industry 2819, Industrial Inorganic Chemicals, N.E.C., had employment of 72.3 thousand. The employment figure was 12 percent below the 81.7 thousand reported in 1982. Compared with 1986, employment in 1987 decreased 4 percent. The 1986 data are based on the Bureau's annual survey of manufactures (ASM), which is a sample survey conducted each year between censuses.

The total value of shipments for establishments classified in this industry was $13.0 billion.

In 1987, establishments in this industry accounted for 85 percent of products considered primary to the industry regardless of the industry in which they were produced (coverage ratio). In 1982, the coverage ratio was 77. The products primary to this industry appear in table 2 and aggregated to $10.3 billion in 1987.

The cost of materials and services used by establishments in this industry amounted to $5.6 billion in 1987. Data on specific materials consumed appear in table 3.

ABBREVIATIONS AND SYMBOLS

The following abbreviations and symbols are used in the tables in this publication:

-	Represents zero.
(D)	Withheld to avoid disclosing data for individual companies; data are included in higher level totals.
(NA)	Not available.
(NC)	Not comparable.
(S)	Withheld because estimate did not meet publication standards on the basis of either the response rate or a consistency review.
(X)	Not applicable.
(Z)	Less than half the unit shown.
do	Ditto.
n.e.c.	Not elsewhere classified.
n.s.k.	Not specified by kind.
pt.	Part.
r	Revised.
SIC	Standard Industrial Classification.

Other abbreviations, such as lb, gal, yd, doz, bbl, and s tons, are used in the customary sense.

CONTACTS FOR DATA USERS

Subject Area	Contact	Phone
Census/ASM		
Durables	Kenneth Hansen	(301) 763-7304
Nondurables	Michael Zampogna	(301) 763-2510
Current Industrial Reports		
Durables	Malcolm Bernhardt	(301) 763-2518
Nondurables	Thomas Flood	(301) 763-5911
Import/Export Publications	Foreign Trade Division	(301) 763-5140
Industry Analysis and Forecasts	International Trade Administration	(202) 377-4356

Table 1. Historical Statistics for the Industry: 1987 and Earlier Years

[Excludes data for auxiliaries. For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendix.]

Year[1]	Companies[2] (no.)	All establishments[3] Total (no.)	All establishments[3] With 20 employees or more (no.)	All employees Number (1,000)	All employees Payroll (million dollars)	Production workers Number (1,000)	Production workers Hours (millions)	Production workers Wages (million dollars)	Value added by manufacture[4] (million dollars)	Cost of materials (million dollars)	Value of shipments (million dollars)	New capital expenditures (million dollars)	End-of-year inventories[4] (million dollars)	Ratios Specialization (percent)	Ratios Coverage (percent)
INDUSTRY 2812, ALKALIES AND CHLORINE															
1987 Census	NA	45	31	5.0	165.3	3.5	7.3	110.0	720.4	805.5	1 532.8	66.7	110.9	86	65
1986 ASM	(NA)	(NA)	(NA)	6.7	218.3	4.5	9.0	137.2	1 028.0	957.9	2 010.9	122.1	131.2	(NA)	(NA)
1985 ASM	(NA)	(NA)	(NA)	8.2	262.2	5.6	11.2	168.0	1 073.7	978.4	2 042.4	175.2	163.9	(NA)	(NA)
1984 ASM	(NA)	(NA)	(NA)	7.4	239.7	5.1	10.6	161.8	869.6	984.0	1 872.4	149.5	171.3	(NA)	(NA)
1983 ASM	(NA)	(NA)	(NA)	7.3	217.9	4.8	9.8	136.8	765.0	898.6	1 666.8	200.3	181.0	(NA)	(NA)
1982 Census	35	51	33	7.6	215.7	5.0	9.8	134.9	728.8	856.3	1 570.5	134.4	199.9	81	53
1981 ASM	(NA)	(NA)	(NA)	7.5	201.7	4.9	10.0	124.9	703.7	852.5	1 542.9	199.1	125.2	(NA)	(NA)
1980 ASM	(NA)	(NA)	(NA)	7.4	177.1	5.0	9.0	110.5	584.1	777.9	1 354.1	131.7	113.2	(NA)	(NA)
1979 ASM	(NA)	(NA)	(NA)	7.5	164.1	5.0	10.0	101.9	548.8	661.4	1 210.7	134.9	85.4	(NA)	(NA)
1978 ASM	(NA)	(NA)	(NA)	10.8	216.9	7.3	15.0	139.6	712.8	869.1	1 586.3	284.6	118.1	(NA)	(NA)
1977 Census	30	49	33	11.8	215.9	8.0	16.0	136.2	822.5	826.7	1 654.8	220.0	141.8	63	58
1976 ASM	(NA)	(NA)	(NA)	13.3	209.2	8.8	17.9	133.6	960.4	852.7	1 797.7	222.8	156.4	(NA)	(NA)
1975 ASM	(NA)	(NA)	(NA)	14.1	203.5	9.8	19.9	133.1	897.9	749.5	1 633.2	183.4	133.6	(NA)	(NA)
1974 ASM	(NA)	(NA)	(NA)	13.7	182.5	9.9	19.9	123.4	697.8	601.0	1 282.4	163.7	110.7	(NA)	(NA)
1973 ASM	(NA)	(NA)	(NA)	13.3	164.6	9.7	19.5	111.8	463.0	416.0	884.0	67.9	63.1	(NA)	(NA)
1972 Census	28	48	39	13.3	152.0	9.6	18.9	102.6	455.6	365.5	823.2	61.5	60.4	65	65
INDUSTRY 2813, INDUSTRIAL GASES															
1987 Census	(NA)	592	136	8.1	241.8	4.1	8.6	115.9	1 601.3	1 043.5	2 643.3	104.4	129.5	98	94
1986 ASM	(NA)	(NA)	(NA)	8.6	248.4	4.0	8.8	112.0	1 386.7	1 002.6	2 401.9	122.1	90.7	(NA)	(NA)
1985 ASM	(NA)	(NA)	(NA)	8.5	223.3	4.5	10.5	115.0	1 466.7	949.1	2 416.0	212.5	87.7	(NA)	(NA)
1984 ASM	(NA)	(NA)	(NA)	7.9	197.2	4.4	9.7	104.1	1 290.3	1 073.0	2 363.5	263.9	80.5	(NA)	(NA)
1983 ASM	(NA)	(NA)	(NA)	7.2	168.1	3.9	8.8	90.2	1 169.6	959.9	2 111.9	107.5	82.9	(NA)	(NA)
1982 Census	105	563	105	7.3	174.0	4.3	9.9	100.8	1 055.3	967.2	2 019.3	223.7	61.0	98	91
1981 ASM	(NA)	(NA)	(NA)	8.8	175.1	5.4	10.9	107.3	1 025.8	838.7	1 857.5	168.1	54.3	(NA)	(NA)
1980 ASM	(NA)	(NA)	(NA)	8.1	153.4	5.2	10.3	92.4	889.0	658.5	1 539.6	209.2	43.2	(NA)	(NA)
1979 ASM	(NA)	(NA)	(NA)	7.3	123.9	4.7	9.4	74.7	827.8	621.2	1 464.7	150.1	38.4	(NA)	(NA)
1978 ASM	(NA)	(NA)	(NA)	7.9	124.1	4.8	9.9	73.8	781.8	599.5	1 385.6	164.4	37.5	(NA)	(NA)
1977 Census	109	562	102	7.5	117.2	4.6	9.6	67.0	732.8	515.9	1 234.6	243.0	45.6	97	93
1976 ASM	(NA)	(NA)	(NA)	8.0	106.6	4.9	10.1	64.6	644.7	482.2	1 132.1	122.4	32.6	(NA)	(NA)
1975 ASM	(NA)	(NA)	(NA)	8.9	108.6	5.2	10.4	63.4	586.1	403.5	985.3	119.2	39.6	(NA)	(NA)
1974 ASM	(NA)	(NA)	(NA)	8.5	93.6	5.2	10.7	55.8	544.0	301.7	843.2	92.1	32.2	(NA)	(NA)
1973 ASM	(NA)	(NA)	(NA)	8.6	92.1	5.7	11.8	60.2	512.8	253.5	765.4	49.0	32.0	(NA)	(NA)
1972 Census	106	503	138	9.6	87.2	5.4	10.6	48.3	466.7	214.9	679.3	84.1	32.7	96	92
INDUSTRY 2816, INORGANIC PIGMENTS															
1987 Census	(NA)	91	56	8.5	269.8	5.2	10.7	150.6	1 410.3	1 017.1	2 415.4	77.4	363.3	94	90
1986 ASM	(NA)	(NA)	(NA)	9.1	277.5	5.6	11.5	155.6	1 152.9	1 036.5	2 192.5	80.3	336.9	(NA)	(NA)
1985 ASM	(NA)	(NA)	(NA)	9.7	275.2	6.0	12.0	155.6	1 044.0	1 017.8	2 077.1	100.8	340.2	(NA)	(NA)
1984 ASM	(NA)	(NA)	(NA)	9.5	257.7	6.0	11.9	143.9	864.6	1 030.3	1 890.4	94.4	332.4	(NA)	(NA)
1983 ASM	(NA)	(NA)	(NA)	10.8	291.6	6.6	13.4	161.8	758.1	1 014.1	1 779.8	93.6	368.5	(NA)	(NA)
1982 Census	86	106	63	11.2	271.3	6.8	13.3	148.6	723.0	892.8	1 630.0	128.9	383.2	88	88
1981 ASM	(NA)	(NA)	(NA)	11.8	261.6	7.4	14.8	144.9	789.3	986.9	1 754.1	86.7	356.9	(NA)	(NA)
1980 ASM	(NA)	(NA)	(NA)	11.9	239.6	7.5	15.3	136.7	709.0	873.7	1 556.9	80.6	319.6	(NA)	(NA)
1979 ASM	(NA)	(NA)	(NA)	11.3	208.4	7.6	15.8	126.3	667.5	809.0	1 486.8	80.3	242.8	(NA)	(NA)
1978 ASM	(NA)	(NA)	(NA)	12.1	198.1	8.2	16.8	124.0	564.9	798.6	1 366.4	69.8	272.8	(NA)	(NA)
1977 Census	71	106	66	11.9	179.8	8.0	16.4	110.2	567.9	695.9	1 259.9	124.3	251.5	89	88
1976 ASM	(NA)	(NA)	(NA)	12.9	181.1	8.6	17.5	107.1	584.9	713.2	1 292.5	76.9	277.9	(NA)	(NA)
1975 ASM	(NA)	(NA)	(NA)	12.4	164.1	8.3	16.9	101.6	468.4	548.8	988.9	76.6	271.3	(NA)	(NA)
1974 ASM	(NA)	(NA)	(NA)	15.6	184.7	11.0	23.0	121.0	590.9	641.9	1 188.6	117.9	227.5	(NA)	(NA)
1973 ASM	(NA)	(NA)	(NA)	13.2	150.5	9.6	20.2	101.5	419.3	461.9	890.2	79.1	135.8	(NA)	(NA)
1972 Census	77	114	69	12.8	134.6	9.0	18.3	87.8	382.6	394.9	796.9	38.9	137.4	86	86
INDUSTRY 2819, INDUSTRIAL INORGANIC CHEMICALS, N.E.C.															
1987 Census	(NA)	654	305	72.3	2 432.3	37.6	82.7	1 143.2	7 355.7	5 584.0	12 980.8	511.2	1 291.8	92	85
1986 ASM	(NA)	(NA)	(NA)	75.0	2 398.8	39.8	82.2	1 159.1	7 405.3	5 504.0	12 885.4	487.3	1 410.9	(NA)	(NA)
1985 ASM	(NA)	(NA)	(NA)	78.6	2 451.9	42.3	86.4	1 183.1	7 500.5	6 074.5	13 724.6	550.8	1 566.7	(NA)	(NA)
1984 ASM	(NA)	(NA)	(NA)	78.8	2 344.5	43.0	87.0	1 160.7	7 391.8	6 374.4	13 771.6	477.6	1 605.1	(NA)	(NA)
1983 ASM	(NA)	(NA)	(NA)	80.3	2 184.2	44.8	87.5	1 090.3	6 511.9	5 717.8	12 199.6	418.7	1 628.9	(NA)	(NA)
1982 Census	425	645	319	81.7	2 134.2	45.7	91.0	1 077.3	6 321.4	5 837.1	12 060.4	512.5	1 705.1	91	77
1981 ASM	(NA)	(NA)	(NA)	85.9	2 068.4	48.1	99.2	1 054.6	6 754.8	6 165.1	12 790.2	657.6	1 591.0	(NA)	(NA)
1980 ASM	(NA)	(NA)	(NA)	87.2	1 894.0	49.9	101.8	1 003.6	6 590.6	5 579.7	12 095.5	598.5	1 223.2	(NA)	(NA)
1979 ASM	(NA)	(NA)	(NA)	80.4	1 614.3	47.7	99.7	885.6	5 583.5	5 060.8	10 623.3	596.5	1 083.5	(NA)	(NA)
1978 ASM	(NA)	(NA)	(NA)	82.1	1 519.8	48.9	100.1	818.7	4 878.0	4 966.5	9 801.4	578.4	1 020.3	(NA)	(NA)
1977 Census	346	564	288	78.2	1 326.7	47.0	96.2	717.9	4 333.1	4 344.0	8 615.7	466.4	858.4	87	77
1976 ASM	(NA)	(NA)	(NA)	74.6	1 186.8	43.7	87.8	615.8	3 974.7	3 475.6	7 388.5	391.1	753.4	(NA)	(NA)
1975 ASM	(NA)	(NA)	(NA)	73.7	1 061.2	43.5	85.8	555.4	3 260.5	2 844.0	6 053.4	341.8	685.9	(NA)	(NA)
1974 ASM	(NA)	(NA)	(NA)	68.5	897.0	42.4	84.6	491.9	2 904.4	2 723.6	5 534.9	254.7	621.3	(NA)	(NA)
1973 ASM	(NA)	(NA)	(NA)	64.6	761.7	40.1	80.1	418.9	2 334.9	1 926.2	4 233.8	176.6	417.4	(NA)	(NA)
1972 Census	166	384	264	63.8	704.7	39.9	80.0	392.4	2 038.2	1 804.1	3 833.3	149.0	384.1	89	79

Note: Establishments of single unit companies with up to 20 employees (cutoff varied by industry) were excluded from the mail portion of the census. Data for these establishments (and a small number of larger establishments whose reports were not received at the time the data were tabulated) were estimated based on administrative record information from other agencies in conjunction with industry averages. These establishments accounted for the following percent of total value of shipments: SIC 2812, 4%; SIC 2813, 8%; SIC 2816, 9%; and SIC 2819, 5%.

[1]In annual survey of manufactures (ASM) years, data are estimates based on a representative sample of establishments canvassed annually and may differ from results of a complete canvass of all establishments. ASM publication shows percentage standard errors. Unless otherwise noted, for data prior to 1972, see 1972 Census of Manufactures, vol. II, table 1a of the Industry chapter.

[2]For the census, a company is defined as a business organization consisting of one establishment or more under common ownership or control.

[3]Includes establishments with payroll at any time during year.

[4]Beginning with the 1982 Census of Manufactures, all respondents were requested to report their inventories at (the lower of) cost or market prior to adjustment to LIFO cost. This is a change from prior Censuses and annual surveys of manufactures in which respondents were permitted to value their inventories using any generally accepted accounting method. Consequently, inventories and value added by manufacture are not comparable to prior-year data.

Table 2. Product and Product Classes—Quantity and Value of Shipments by All Producers: 1987 and 1982

[Includes quantity and value of products of this industry produced by (1) establishments classified in this industry (primary) and (2) establishments classified in other industries (secondary). Transfers of products of this industry from one establishment of a company to another establishment of the same company (interplant transfers) are also included. For further explanation, see Value of Shipments in appendix. For meaning of abbreviations and symbols, see introductory text]

1987 product code	Product	1987		1982	
		Number of companies with shipments of $100,000 or more	Value of product shipments[1] (million dollars)	Number of companies with shipments of $100,000 or more	Value of product shipments[1] (million dollars)
2812– —	**ALKALIES AND CHLORINE**				
	Total	**(NA)**	**1 998.8**	**(NA)**	**2 346.1**
28121 —	Chlorine, compressed or liquefied:				
28121 00	Chlorine, compressed or liquefied (for additional detail, see Current Industrial Report MA-28A, Inorganic Chemicals)	23	788.1	24	440.8
28123 —	Sodium hydroxide (caustic soda):				
28123 00	Sodium hydroxide (caustic soda) (for additional detail, see Current Industrial Report MA-28A, Inorganic Chemicals)	23	934.2	24	1 584.2
28125 —	Other alkalies:				
28125 00	Other alkalies (for additional detail, see Current Industrial Report MA-28A, Inorganic Chemicals)	13	258.7	14	294.0
28120 —	Alkalies and chlorine, n.s.k.	(NA)	17.8	(NA)	27.1
28120 00	Alkalies and chlorine, n.s.k., typically for establishments with 5 employees or more (see note)	(NA)	(Z)	(NA)	20.0
28120 02	Alkalies and chlorine, n.s.k., typically for establishments with less than 5 employees (see note)	(NA)	17.8	(NA)	7.1
2813– —	**INDUSTRIAL GASES**				
	Total	**(NA)**	**2 627.6**	**(NA)**	**2 002.2**
28132 —	Acetylene:				
28132 00	Acetylene (for additional detail, see Current Industrial Report MA-28C, Industrial Gases)	30	110.6	37	136.0
28133 —	Carbon dioxide:				
28133 00	Carbon dioxide (for additional detail, see Current Industrial Report MA-28C, Industrial Gases)	45	292.2	40	207.5
28135 —	Nitrogen:				
28135 00	Nitrogen (for additional detail, see Current Industrial Report MA-28C, Industrial Gases)	20	775.5	21	632.0
28136 —	Oxygen:				
28136 00	Oxygen (for additional detail, see Current Industrial Report MA-28C, Industrial Gases)	21	620.6	29	578.3
28137 —	Other industrial gases, including elemental, compressed, and liquefied types, n.e.c.[3]				
28137 00	Other industrial gases, including elemental, compressed, and liquefied types, n.e.c. (including argon and hydrogen) (for additional detail, see Current Industrial Report MA-28C, Industrial Gases)	41	707.7	49	376.5
28130 —	Industrial gases, n.s.k.	(NA)	121.0	(NA)	71.9
28130 00	Industrial gases, n.s.k., typically for establishments with 10 employees or more (see note)	(NA)	53.8	(NA)	56.4
28130 02	Industrial gases, n.s.k., typically for establishments with less than 10 employees (see note)	(NA)	67.2	(NA)	15.5

1987 product code	Product	1987				1982			
		Number of companies with shipments of $100,000 or more	Quantity of production for all purposes	Product shipments[1]		Number of companies with shipments of $100,000 or more	Quantity of production for all purposes	Product shipments[1]	
				Quantity[2]	Value (million dollars)			Quantity[2]	Value (million dollars)
2816– —	**INORGANIC PIGMENTS**								
	Total	**(NA)**	**(X)**	**(X)**	**2 411.1**	**(NA)**	**(X)**	**(X)**	**1 590.7**
28161 —	Titanium pigments	(NA)	(X)	(X)	[4]1 553.2	(NA)	(NA)	(NA)	(NA)
28161 11	Titanium pigments, composite and pure (100 percent TiO_2) (for additional detail, see Current Industrial Report MA-28A, Inorganic Chemicals)	4	(X)	(X)	1 482.2	13	(X)	(X)	845.8
28161 21	Titanium pigment preparations	4	(X)	(X)	[4]71.0				
28161 00	Titanium pigments, n.s.k.	–	(X)	(X)	–				
28162 —	Other white opaque pigments	(NA)	(X)	(X)	199.8	(NA)	(X)	(X)	189.3
28162 13	White lead, basic carbonate and sulfate, excluding white lead in oil (1,000 s tons)	2	[5]	[5]	[5]	4	6.6	6.6	7.9
28162 24	Zinc oxide pigments (do.)	8	139.2	131.5	117.1	10	129.3	128.6	110.7
28162 30	Lithopone and other pigments and preparations based on zinc sulfide (do.)	1							
28162 40	Antimony oxide pigments (do.)	2	[5](S)	[5](S)	[5]80.8	9	(S)	(S)	69.0
28162 50	Antimony oxide pigment preparations (do.)	–							
28162 60	All other inorganic white opaque pigments (do.)	2							
28162 00	Other white opaque pigments, n.s.k.	(NA)	(X)	(X)	1.9	(NA)	(X)	(X)	1.7
28163 —	Chrome colors and other inorganic pigments	(NA)	(X)	(X)	611.0	(NA)	(X)	(X)	529.3
28163 10	Chrome colors (for additional detail, see Current Industrial Report MA-28A, Inorganic Chemicals)	12	(X)	(X)	129.8	13	(X)	(X)	103.2
28163 27	White extender pigments, including barytes, blanc fixe, and whiting (1,000 s tons)	5	378.1	384.0	103.7	5	(S)	51.1	32.8

See footnotes at end of table.

Table 2. Product and Product Classes—Quantity and Value of Shipments by All Producers: 1987 and 1982—Con.

[Includes quantity and value of products of this industry produced by (1) establishments classified in this industry (primary) and (2) establishments classified in other industries (secondary). Transfers of products of this industry from one establishment of a company to another establishment of the same company (interplant transfers) are also included. For further explanation, see Value of Shipments in appendix. For meaning of abbreviations and symbols, see introductory text]

1987 product code	Product	1987				1982			
		Number of companies with shipments of $100,000 or more	Quantity of production for all purposes	Product shipments[1]		Number of companies with shipments of $100,000 or more	Quantity of production for all purposes	Product shipments[1]	
				Quantity[2]	Value (million dollars)			Quantity[2]	Value (million dollars)
2816- —	**INORGANIC PIGMENTS**—Con.								
28163 —	Chrome colors and other inorganic pigments—Con.								
	Color pigments other than chrome colors and lakes and toners:								
28163 31	Iron oxide pigments ..... 1,000 s tons..	13	(S)	(S)	184.9	11	(S)	(S)	137.6
	Colored lead pigments:								
28163 41	Red lead ..... 1,000 s tons..	–	–	–	–	3	(D)	(D)	(D)
28163 45	Litharge ..... do..	1	(D)	(D)	(D)	5	(D)	(D)	(D)
28163 88	Carbon blacks (bone and lamp), excluding furnace and channel carbon black and charcoal ..... mil lb..	3	(S)	(S)	2.0	4	4.6	**5.0	3.3
28163 89	Cadmium sulfide pigments ..... do..	3	(D)	(D)	(D)	4	1.8	*2.9	7.0
28163 91	Ceramic colors ..... do..	5	10.4	10.1	40.1	11	(S)	(S)	47.3
	All other color pigments, n.e.c., including ultramarine blue (excluding organic pigments, lakes, and toners):								
28163 95	Containing lead ..... mil lb..	1	(D)	(D)	(D)	5	(S)	(S)	27.2
28163 97	Not containing lead ..... do..	7	(S)	(S)	94.4	11	(S)	(S)	94.2
28163 00	Chrome colors and other inorganic pigments, n.s.k.	(NA)	(X)	(X)	44.4	(NA)	(X)	(X)	32.7
28160 —	Inorganic pigments, n.s.k.	(NA)	(X)	(X)	47.1	(NA)	(X)	(X)	26.3
28160 00	Inorganic pigments, n.s.k., typically for establishments with 10 employees or more (see note)	(NA)	(X)	(X)	1.5	(NA)	(X)	(X)	16.9
28160 02	Inorganic pigments, n.s.k., typically for establishments with less than 10 employees (see note	(NA)	(X)	(X)	45.6	(NA)	(X)	(X)	9.4

1987 product code	Product	1987		1982	
		Number of companies with shipments of $100,000 or more	Value of product shipments[1] (million dollars)	Number of companies with shipments of $100,000 or more	Value of product shipments[1] (million dollars)
2819- —	**INDUSTRIAL INORGANIC CHEMICALS, N.E.C.**				
	Total	**(NA)**	**10 259.3**	**(NA)**	**9 698.2**
28193 —	Sulfuric acid:				
28193 00	Sulfuric acid (for additional detail, see Current Industrial Report MA-28B, Inorganic Fertilizer Materials and Related Products)	50	555.9	56	586.0
28194 —	Inorganic acids, except nitric, sulfuric, and phosphoric:				
28194 00	Inorganic acids, except nitric, sulfuric, and phosphoric (for additional detail, see Current Industrial Report MA-28A, Inorganic Chemicals)	50	479.1	53	478.6
28195 —	Aluminum oxide:				
28195 00	Aluminum oxide, except natural alumina (100 percent Al_2O_3) (for additional detail, see Current Industrial Report MA-28A, Inorganic Chemicals)	9	614.7	7	844.2
28196 —	Other aluminum compounds:				
28196 00	Other aluminum compounds (for additional detail, see Current Industrial Report MA-28A, Inorganic Chemicals)	37	413.3	28	376.8
28197 —	Potassium and sodium compounds, except alkalies, alums, and bleaches:				
28197 00	Potassium and sodium compounds, except alkalies, alums, and bleaches (for additional detail, see Current Industrial Report MA-28A, Inorganic Chemicals)	70	1 436.7	70	1 462.8
28198 —	Chemical catalytic preparations:				
28198 00	Chemical catalytic preparations (for additional detail, see Current Industrial Report MA-28A, Inorganic Chemicals)	34	1 067.1	30	676.5
28199 —	Other inorganic chemicals, n.e.c.:				
28199 00	Other inorganic chemicals, n.e.c. (for additional detail, see Current Industrial Report MA-28A, Inorganic Chemicals)	221	5 229.1	217	4 790.7
28190 —	Industrial inorganic chemicals, n.e.c., n.s.k.	(NA)	463.4	(NA)	482.6
28190 00	Industrial inorganic chemicals, n.e.c., n.s.k., typically for establishments with 5 employees or more (see note)	(NA)	309.8	(NA)	406.0
28190 02	Industrial inorganic chemicals, n.e.c., n.s.k., typically for establishments with less than 5 employees (see note)	(NA)	153.6	(NA)	76.6

Note: In 1987 Census of Manufactures, data for establishments of small single unit companies with up to 20 employees were estimated from administrative-record data rather than data actually collected from respondents. Employment cutoffs used for administrative records for each industry and shipments figures are included in code ending with "002". In both 1987 and 1982 Censuses of Manufactures, products not completely identified on standard forms were coded in appropriate product class (five-digit) followed by "00" or to appropriate product group code (four-digit) followed by "000".

[1]Data reported by all producers, not just those with shipments of $100,000 or more.

[2]For some establishments, data have been estimated from central unit values which are based on quantity-value relationships of reported data. The following symbols are used when percentage of each quantity figure estimated in this manner equals or exceeds 10 percent of published figure: * 10 to 19 percent estimated; ** 20 to 29 percent estimated. If 30 percent or more is estimated, figure is replaced by (S).

[3]Excludes hydrocarbon gases such as propane, butane, and propylene, or halogenated hydrocarbons and cyclopropane, which are reported to the U.S. International Trade Commission. Also, excludes sulfur dioxide, which is classified as primary to industry 2819; chlorine, primary to industry 2812; and helium produced in Government-owned plants.

[4]Prior to 1987, data for titanium dioxide preparations were typically reported under product class 28162, Other White Opaque Pigments. Only 100 % titanium dioxide was reported under product class 28161.

[5]For 1987, product code 2816213 is included with product codes 2816230, 2816240, 2816250, and 2816260 to avoid disclosing data for individual companies.

Table 3. Materials Consumed by Kind: 1987 and 1982

[Includes quantity and cost of materials consumed or put into production by establishments classified only in this industry. For further explanation, see Cost of Materials in appendix. For meaning of abbreviations and symbols, see introductory text]

1987 material code	Material		1987			1982		
			Consumption of materials received from other establishments		Materials made and consumed in same plant (quantity)	Consumption of materials received from other establishments		Materials made and consumed in same plant (quantity)
			Quantity[1]	Delivered cost (million dollars)		Quantity[1]	Delivered cost (million dollars)	
	INDUSTRY 2812, ALKALIES AND CHLORINE							
	Materials, parts, containers, and supplies		**(X)**	**350.7**	**(X)**	**(X)**	**324.2**	**(X)**
	Inorganic chemicals:							
	Acids, except spent acids:							
287311	Nitric acid (100% HNO_3)	1,000 s tons	-	-	(X)	(D)	(D)	-
287410	Phosphoric acid (100% P_2O_5)	do	-	-	(NA)	(D)	(D)	-
281931	Sulfuric acid (100% H_2SO_4)	do	49.9	3.4	(NA)	46.5	3.6	(D)
281211	Chlorine (100% Cl)	do	15.2	2.4	(NA)	**101.4	6.4	275.5
281996	Phosphorous, elemental (technical)	do	-	-	(X)	-	-	-
281228	Sodium carbonate (soda ash) (58% Na_2O)	do	(D)	(D)	(NA)	74.1	7.1	(D)
281238	Sodium hydroxide (caustic soda) (100% NaOH)	do	34.0	3.9	(NA)	(S)	4.4	41.9
289911	Salt in brine	do	4 225.1	51.7	(NA)	1 963.3	31.0	2 201.1
286003	Synthetic organic chemicals		(X)	(D)	(X)	(X)	[2]	(X)
147007	Crude chemical nonmetallic minerals, including barite, borate, potash, fluorspar, rock salt, etc., but excluding phosphate rock and pyrites		(X)	(D)	(X)	(X)	29.7	(X)
331210	Coke, including breeze, used as a raw material	1,000 s tons	-	-	(X)	-	-	-
	Other parts, materials, and accessories:							
355911	Parts and attachments for machinery and equipment		(X)	40.5	(X)	(X)	47.9	(X)
265001	Paperboard boxes, containers, and corrugated paperboard		(X)	(D)	(X)	(X)	7.9	(X)
340001	Metal containers		(X)	(D)	(X)	(X)	5.5	(X)
970099	All other materials and components, parts, containers, and supplies		(X)	177.9	(X)	(X)	*3161.1	(X)
971000	Materials, parts, containers, and supplies, n.s.k.[2]		(X)	21.5	(X)	(X)	19.5	(X)
	INDUSTRY 2816, INORGANIC PIGMENTS							
	Materials, containers, and supplies		**(X)**	**786.4**	**(X)**	**(X)**	**678.8**	**(X)**
	Inorganic chemicals:							
	Acids, except spent acids:							
287311	Nitric acid (100% HNO_3)	1,000 s tons	(D)	(D)	(X)	5.7	.7	(D)
287410	Phosphoric acid (100% P_2O_5)	do	(S)	.8	(NA)	**1.0	.6	-
281931	Sulfuric acid (100% H_2SO_4)	do	*257.9	13.6	(NA)	254.8	16.1	443.3
281211	Chlorine (100% Cl)	do	(D)	(D)	(NA)	304.1	33.6	(D)
281996	Phosphorous, elemental (technical)	do	-	-	(X)	-	-	-
281228	Sodium carbonate (soda ash) (58% Na_2O)	do	5.4	1.0	(NA)	(D)	(D)	(D)
281238	Sodium hydroxide (caustic soda) (100% NaOH)	do	**125.1	12.4	(NA)	62.1	10.4	(D)
289911	Salt in brine	do	(Z)	(Z)	(NA)	(D)	(D)	-
286003	Synthetic organic chemicals		(X)	21.1	(X)	(X)	*44.5	(X)
	Crude materials:							
109901	Bauxite	1,000 s tons	-	-	(X)	-	-	(X)
147501	Phosphate rock	do	-	-	(X)	-	-	(X)
147901	Sulfur	1,000 l tons	(D)	(D)	(X)	(D)	(D)	(X)
100107	Iron and ferrous alloy ores, including tungsten, chromite, manganese, molybdenum, and cobalt		(X)	(D)	(X)	(X)	4.6	(X)
100207	Nonferrous metal ores, including copper, mercury, vanadium, titanium, platinum, etc.		(X)	238.9	(X)	(X)	153.3	(X)
147007	Crude chemical nonmetallic minerals, including barite, borate, potash, fluorspar, rock salt, etc., but excluding phosphate rock and pyrites		(X)	28.3	(X)	(X)	8.5	(X)
331210	Coke, including breeze, used as a raw material	1,000 s tons	272.9	30.2	(X)	168.9	25.7	(X)
	Other parts, materials, and accessories:							
355911	Parts and attachments for machinery and equipment		(X)	61.4	(X)	(X)	36.9	(X)
265001	Paperboard boxes, containers, and corrugated paperboard		(X)	10.8	(X)	(X)	16.2	(X)
340001	Metal containers		(X)	.7	(X)	(X)	3.0	(X)
970099	All other materials and components, parts, containers, and supplies		(X)	172.7	(X)	(X)	279.5	(X)
971000	Materials, containers, and supplies, n.s.k. [2]		(X)	72.3	(X)	(X)	24.1	(X)
	INDUSTRY 2819, INDUSTRIAL INORGANIC CHEMICALS, N.E.C.							
	Materials, containers, and supplies[4]		**(X)**	**3 745.5**	**(X)**	**(X)**	**3 805.5**	**(X)**
	Inorganic chemicals:							
	Acids, except spent acids:							
287311	Nitric acid (100% HNO_3)	1,000 s tons	*61.2	9.4	(X)	**42.7	7.2	(D)
287410	Phosphoric acid (100% P_2O_5)	do	259.3	77.1	(NA)	121.8	46.4	390.9
281931	Sulfuric acid (100% H_2SO_4)	do	1 388.2	75.6	(NA)	1 060.6	65.8	663.4
281211	Chlorine (100% Cl)	do	129.3	17.8	(NA)	(S)	11.0	(D)
281996	Phosphorous, elemental (technical)	do	257.1	282.4	(X)	327.3	346.3	(D)
281228	Sodium carbonate (soda ash) (58% Na_2O)	do	582.2	70.8	(NA)	*975.8	124.4	193.2
281238	Sodium hydroxide (caustic soda) (100% NaOH)	do	767.5	76.2	(NA)	*553.1	99.4	(D)
289911	Salt in brine	do	*568.2	11.0	(NA)	555.0	12.3	(D)
286003	Synthetic organic chemicals		(X)	98.6	(X)	(X)	[2]	(X)
	Crude materials:							
109901	Bauxite	1,000 s tons	8 443.5	282.5	(X)	6 894.5	289.6	(X)
147501	Phosphate rock	do	**3 157.8	57.7	(X)	(S)	66.2	(X)
147901	Sulfur	1,000 l tons	1 006.5	114.0	(X)	1 146.6	144.5	(X)
100107	Iron and ferrous alloy ores, including tungsten, chromite, manganese, molybdenum, and cobalt		(X)	52.6	(X)	(X)	207.4	(X)
100207	Nonferrous metal ores, including copper, mercury, vanadium, titanium, platinum, etc.		(X)	184.3	(X)	(X)	43.2	(X)
147007	Crude chemical nonmetallic minerals, including barite, borate, potash, fluorspar, rock salt, etc., but excluding phosphate rock and pyrites		(X)	63.7	(X)	(X)	51.4	(X)
331210	Coke, including breeze, used as a raw material	1,000 s tons	*487.3	49.9	(X)	758.2	78.5	(X)

See footnotes at end of table.

Table 3. **Materials Consumed by Kind: 1987 and 1982**—Con.

[Includes quantity and cost of materials consumed or put into production by establishments classified only in this industry. For further explanation, see Cost of Materials in appendix. For meaning of abbreviations and symbols, see introductory text]

1987 material code	Material	1987			1982		
		Consumption of materials received from other establishments		Materials made and consumed in same plant (quantity)	Consumption of materials received from other establishments		Materials made and consumed in same plant (quantity)
		Quantity[1]	Delivered cost (million dollars)		Quantity[1]	Delivered cost (million dollars)	
	INDUSTRY 2819, INDUSTRIAL INORGANIC CHEMICALS, N.E.C.—Con.						
	Other parts, materials, and accessories:						
355911	Parts and attachments for machinery and equipment	(X)	104.7	(X)	(X)	130.7	(X)
265001	Paperboard boxes, containers, and corrugated paperboard	(X)	38.8	(X)	(X)	35.9	(X)
340001	Metal containers	(X)	25.4	(X)	(X)	22.9	(X)
970099	All other materials and components, parts, containers, and supplies	(X)	1 622.8	(X)	(X)	[3]1 598.3	(X)
971000	Materials, containers, and supplies, n.s.k.[2]	(X)	432.2	(X)	(X)	424.1	(X)

[1]For some establishments, data have been estimated from central unit values which are based on quantity-cost relationships of reported data. The following symbols are used when percentage of each quantity figure estimated in this manner equals or exceeds 10 percent of published figure: * 10 to 19 percent estimated; ** 20 to 29 percent estimated. If 30 percent or more is estimated, figure is replaced by (S).

[2]Total cost of materials of establishments that did not report detailed materials data, including establishments that were not mailed a form.

[3]For 1982, material code 286003 is included with material code 970099.

[4]Excludes data on materials purchased and consumed by Government-owned, contractor-operated plants.

APPENDIX
Scope and Coverage and Explanation of Terms

GENERAL

The 1987 Census of Manufactures is the 32nd census of manufacturing establishments conducted in the United States. For 1987, it was conducted as part of the economic censuses, which included the censuses of mineral industries, construction industries, retail and wholesale trades, service industries, selected transportation activities, and minority-owned and women-owned businesses, under authority of title 13 of the United States Code. Title 13 specifies that an economic census be conducted every 5 years to cover years ending in 2 and 7.

SCOPE AND COVERAGE

Establishment Basis of Reporting

The census of manufactures is conducted on an establishment basis. All manufacturing establishments with one paid employee or more at any time during the year are covered by the census of manufactures. Therefore, a company operating at more than one location is required to file a separate report for each location. This report excludes information for separately operated administrative offices, warehouses, garages, and other auxiliary units which service manufacturing establishments of the same company. Where these auxiliary operations are conducted at the same location as the manufacturing operation, they are usually included in the report for the operating manufacturing establishment.

Use of Administrative Records

From a universe of approximately 350,000 manufacturing establishments in the 1987 Census of Manufactures, approximately 150,000 small single-establishment companies were excused from filing reports. Selection of the small establishment nonmail cases was done on an industry-by-industry basis. A variable cutoff was used to determine those establishments for which administrative records were to be used in place of a census report. The cutoffs were selected so the administrative-record cases would account for approximately 3 percent or less of the value of shipments for the industry. These cutoffs were then adjusted so that all single-establishment companies with less than 5 employees were excluded from the mail canvass, while all establishments with more than 20 employees were included. Where establishments in the 5 to 20 employee size range were included in the mail canvass, an abbreviated census form was frequently used.

For these nonmail establishments, (and a small number of larger establishment whose reports were not received at the time the data were tabulated) data on employment, payroll, and receipts were obtained from administrative records of other government agencies rather than from census forms. The administrative-record information was then used in conjunction with industry averages to estimate the data for these establishments. The value of shipments and cost of materials were not distributed among specific products and materials but were included in the product and material "not specified by kind" (n.s.k.) categories.

EXPLANATION OF TERMS

Number of establishments and companies–A separate report was required for each manufacturing establishment (plant) with one employee or more. An establishment is defined as a single physical location where manufacturing is performed. A company, on the other hand, is defined as a business organization consisting of one establishment or more under common ownership or control.

All employees–Includes all full-time and part-time employees on the payrolls at any time during the year. Included are all persons on paid sick leave, paid holidays, and paid vacations. Officers of corporations are included as employees; proprietors and partners of unincorporated firms are excluded. The "all employees" number is the average number of production workers plus the number of other employees in mid-March. The number of production workers is the average of those for midmonth payroll periods of March, May, August, and November.

Production workers–Includes workers up through the working-supervisor level engaged in fabricating, processing, assembling, inspecting, receiving, packing, warehousing, shipping (but not delivering), maintenance, repair, janitorial, guard services, product development, auxiliary production for plant's own use (e.g., powerplant), recordkeeping, and other closely associated services. Truckdrivers delivering ready-mixed concrete are also included in production workers.

Other employees–Includes nonproduction personnel, including those engaged in the following activities: supervision above working-supervisor level, sales (including driver/salespersons), sales delivery (truckdrivers and helpers), advertising, credit collection, installation and

servicing of own product, clerical and routine office functions, executive, purchasing, finance, legal, personnel (including cafeteria, etc.), professional, and technical employees.

Payroll–Includes the gross earnings for the "employees" defined above, such as salaries, wages, commissions, dismissal pay, bonuses, vacation and sick leave pay, and compensation in kind, prior to such deductions as employees' Social Security contributions, withholding taxes, group insurance, union dues, and savings bonds. Respondents were told that in reporting they could follow the definition of payrolls used for calculating the Federal withholding tax.

Production-worker hours–Covers hours worked or paid for at the plant, including actual overtime hours (not straight-time equivalent hours). It excludes hours paid for vacations, holidays, or sick leave when the employee was not at the plant.

Cost of materials–Refers to direct charges actually paid or payable for items consumed or put into production during the year, including freight charges and other direct charges incurred by the establishment in acquiring these materials. It includes the cost of materials or fuels consumed, regardless of whether they were purchased by the individual establishment from other companies, transferred to it from other establishments of the same company, or withdrawn from inventory during the year.

The important components of this cost item are (a) all raw materials, semifinished goods, parts, containers, scrap, and supplies put into production or used as operating supplies and for repair and maintenance during the year; (b) electric energy purchased; (c) fuels consumed for heat, power, or generating electricity; (d) work done by others on materials or parts furnished by manufacturing establishments (contract work); and (e) products bought and resold in the same condition.

Specific materials consumed (table 3)–In addition to the total cost of materials which every establishment was required to report, information was also collected for most manufacturing industries on the consumption of major materials used in manufacturing. These inquiries were restricted to those materials which were important parts of the cost of production in a particular industry and for which cost information was available from manufacturers' records. Establishments consuming less than a specified amount (usually $10,000) of a specific material were not requested to report consumption of that material separately. Also, the cost of materials for the small establishments for which administrative records were used was estimated as "not specified by kind" (n.s.k.).

Value of shipments and other receipts–Generally refers to received or receivable net selling values, f.o.b. plant (exclusive of freight and taxes), of all products shipped, both primary and secondary, as well as all miscellaneous receipts such as receipts for contract work performed for others, installation and repair receipts, sale of scrap, and sale of products bought and resold without further processing. Included are all items made by or for the establishment from materials owned by it whether sold, transferred to other plants of the same company, or shipped on consignment. The net selling value of products made in one plant on a contract basis from materials owned by another was reported by the plant providing the materials.

In a few industries, the value of production or value of work completed is used instead of value of shipments. These industries are identified in the introduction and are footnoted in table 1.

In the case of multiunit companies, the manufacturer was requested to report the value of products transferred to other establishments of the same company at full economic or commercial value, that is, including not only the direct costs of production but also a reasonable proportion of "all other costs" (including company overhead and profit).

Shipments or production of individual products (table 2)–In the 1987 census, detailed shipment information was collected for approximately 11,000 individual products. These products are identified by a seven-digit code and are grouped into approximately 1,500 classes of products, which in turn are primary to 459 four-digit industries. Data at the five-digit product-class level have been collected each year as part of the annual survey of manufactures. Information at the seven-digit level, collected for many industries in the current industrial reports program, is not included in this table.

Value added by manufacture–This measure of manufacturing activity is derived by subtracting the cost of materials, supplies, containers, fuel, purchased electricity, and contract work from the value of shipments for products manufactured plus receipts for services rendered. The result of this calculation is then adjusted by the addition of value added by merchandising operations (that is, the difference between the sales value and cost of merchandise sold without further manufacturing, processing, or assembly) plus the net change in finished goods and work-in-process inventories between the beginning and end of the year.

For those industries where value of production is collected instead of value of shipments (see footnote in table 1), value added is adjusted only for the change in work-in-process inventories between the beginning and end of the year. For those industries where value of work done is collected, the value added does not include an adjustment for the change in finished goods or work-in-process inventories.

Value added avoids the duplication in the figure for value of shipments which results from the use of products of some establishments as materials by others. Value

added is considered to be the best value measure available for comparing the relative economic importance of manufacturing among industries and geographic areas.

Expenditures for new plant and equipment–Establishments in operation and any known plants under construction were asked to report their expenditures for (a) permanent additions and major alterations to manufacturing establishments and (b) new machinery and equipment used for replacement and additions to plant capacity if they are of the type for which depreciation accounts are ordinarily maintained.

These totals exclude expenditures for used plant and equipment, expenditures for land, and cost of maintenance and repairs charged as current operating expenses. Data for used plant and equipment will be published in the final industry bulletin.

End-of-year inventories–Comprised of (a) finished products; (b) work-in-process; and (c) materials, supplies, fuels, etc. Beginning in 1982, respondents were asked to report their inventories at (the lower of) cost or market prior to adjustment to LIFO cost. This is a change from prior years in which respondents were permitted to value their inventories using any generally accepted accounting method. Therefore, 1982 through 1987 data for inventories are not strictly comparable to prior-year data.

Specialization and coverage ratios–An establishment is classified in a particular industry if its shipments of primary products of the industry exceed in value its shipments of the products of any other single industry. An establishments' shipments include those products assigned to an industry (primary products), those considered primary to other industries (secondary products), and receipts for miscellaneous activities (merchandising, contract work, resales, etc.). The following ratios have been developed to measure the relationship of primary product shipments to the data on shipments for the industry shown in table 1 and data on product shipments shown in table 2.

Specialization ratio–Represents the ratio of primary product shipments to total product shipments (primary and secondary, excluding miscellaneous receipts) for the establishments classified in the industry.

Coverage ratio–Represents the ratio of primary products shipped by the establishments classified in the industry to the total shipments of such products that are shipped by all manufacturing establishments, wherever classified.